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(54) Cleansing compositions

(57) A personal cleansing composition comprising:

- (a) from about 5% to about 50% by weight of one or more surfactants selected from anionic, zwitterionic and amphoteric surfactants and mixtures thereof;
- (b) from about 0.1% to about 20% by weight of soluble or dispersible nonionic surfactant selected from ethoxylated animal and vegetable oils and fats and mixtures thereof;
- (c) from about 0.5% to about 10% by weight of urea;
- (d) from about 0.1% to about 5% by weight of  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestering agent; (e) optionally up to about 10% by weight of perfume or cosmetic oil; and,
- (f) water,

The cleansing products demonstrate excellent mildness, conditioning, moisturising benefits, stability, lathering and rinsibility.

The sequestering agent may be a polycarboxylate, amino polycarboxylate, polyphosphate, polyphosphonate, aminopolyphosphonate or their water soluble salts. In particular the agent may be EDTA, ethylenediamine -disuccinic acid, diethylenetriamine pentaacetic acid or salts thereof.

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## **CLEANSING COMPOSITIONS**

### **TECHNICAL FIELD**

The present invention relates to cleansing compositions. In particular it relates to mild personal cleansing compositions with good skin feel attributes and foaming properties suitable for simultaneously cleansing and conditioning the skin and/or the hair and which may be used, for example, in the form of foam bath preparations, shower products, skin cleansers, hand, face and body cleansers, shampoos, etc.

### **BACKGROUND OF THE INVENTION**

Mild cosmetic compositions must satisfy a number of criteria including cleansing power, foaming properties and mildness/low irritancy/good feel with respect to the skin, hair and the ocular mucosae. Skin is made up of several layers of cells which coat and protect the keratin and collagen fibrous proteins that form the skeleton of its structure. The outermost of these layers, referred to as the stratum corneum, is known to be composed of 250 Å protein bundles surrounded by 80 Å thick layers. Hair similarly has a protective outer coating enclosing the hair fibre which is called the cuticle. Anionic surfactants can penetrate the stratum corneum membrane and the cuticle and, by delipidization destroy membrane integrity. This interference with skin and hair protective membranes can lead to a rough skin feel and eye irritation and may eventually permit the surfactant to interact with the keratin and hair proteins creating irritation and loss of barrier and water retention functions.

Ideal cosmetic cleansers should cleanse the skin or hair gently, without defatting and/or drying the hair and skin and without irritating the

ocular mucosae or leaving skin taut after frequent use. Most lathering soaps, shower and bath products, shampoos and bars fail in this respect.

Certain synthetic surfactants are known to be mild. However, a major drawback of most mild synthetic surfactant systems when formulated for shampooing or personal cleansing is poor lather performance compared to the highest shampoo and bar soap standards. Thus, surfactants that are among the mildest, such as sodium lauryl glyceryl ether sulfonate, (AGS), are marginal in lather. The use of known high sudsing anionic surfactants with lather boosters, on the other hand, can yield acceptable lather volume and quality but at the expense of clinical skin mildness. These two facts make the surfactant selection, the lather and mildness benefit formulation process a delicate balancing act.

Despite the many years of research that have been expended by the toiletries industry on personal cleansing, the broad mass of consumers remain dissatisfied by the mildness of present day cleansing compositions, finding, for example, that they have to apply a separate cosmetic lotion or cream moisturizer to the skin after using a shower or bath preparation in order to maintain skin suppleness and hydration and to counteract the delipidizing effect of the cleanser.

Thus a need exists for personal cleansing products which will not dehydrate the skin or result in loss of skin suppleness, which will provide a level of skin conditioning performance in a wash and rinse-off product which previously has only been provided by a separate post-cleansing cosmetic moisturizer and which will produce a foam which is stable and of high quality, which are effective hair and skin cleansers, which have good rinsibility characteristics, and which at the same time have stable product and viscosity characteristics and remain fully stable under long term and stressed temperature storage conditions.

It has now been found that personal cleansing compositions having improved skin feel, moisturisation, dryness and smoothness attributes both in use and after use and good product stability can be formed by the use of certain combinations of urea, sequestering agents and soluble or dispersible nonionic surfactants.

### SUMMARY OF THE INVENTION

The subject of the present invention is a mild, foam-producing cleansing product suitable for personal cleansing of the skin or hair and which may be used as foam bath and shower products, skin cleansers and shampoos etc. According to one aspect of the invention, there is provided a detergent, personal cleansing or cosmetic composition comprising:

- (a) from about 5% to about 50% by weight of one or more surfactants selected from anionic, zwitterionic and amphoteric surfactants and mixtures thereof;
- (b) from about 0.1% to about 20% by weight of soluble or dispersible nonionic surfactants selected from ethoxylated animal and vegetable oils and fats and mixtures thereof;
- (c) from about 0.5% to 10% by weight of urea;
- (d) from about 0.1% to about 5% by weight of  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestering agent;
- (e) optionally up to about 10% by weight of perfume or cosmetic oil; and,
- (f) water.

In a highly preferred embodiment, the invention takes the form of a foam producing cleansing composition with superior skin feel characteristics, improved perceived dryness and assessed tightness and expertly graded dryness, combined with excellent lathering, good stability, cleansing ability and conditioning performance.

All concentrations and ratios herein are by weight of the cleansing composition, unless otherwise specified. Surfactant chain lengths are also on a weight average chain length basis, unless otherwise specified.

The cleansing compositions herein are based on a combination of urea, mild surfactants, sequestering agent and certain nonionic surfactants derived from vegetable and animal oils and fats, sometimes referred to herein as "oil-derived" nonionic surfactants.

Urea is utilised in the compositions of the present invention to provide enhanced skin feel via skin softening/moisturising benefits. The total level of urea is from about 0.5% to about 10%, preferably 0.5% to about 8%, more preferably from about 2% to about 6% by weight.

The compositions according to the present invention also include as an essential feature a sequestering agent for calcium and/or magnesium ions and which preferably has a calcium ion stability constant (pK  $\text{Ca}^{2+}$ ) of at least about 5, preferably at least about 6, more preferably at least about 7 at 25°C. Literature values of stability constants are taken where possible. Where doubt arises, the stability constant is defined at zero ionic strength using a glass electrode method of measurement as described in *Complexation in Analytical Chemistry* by Anders Ringbom (1963). The total level of sequestering agent is from about 0.1% to about 5%, preferably 0.5% to 2% by weight. It is believed that the presence of sequestering agent adds to the overall skin feel benefit by chelating the metal ions which are in turn associated with dry skin flakes. This in turn contributes to improved urea moisturisation efficacy. Suitable sequestering agents for use in compositions according to the invention are selected from polycarboxylates, amino polycarboxylates, polyphosphates, polyphosphonates and aminopolyphosphonates, and their water soluble salts and mixtures thereof. Preferred sequestering agents include ethylenediaminedisuccinic acid, ethylenediaminetetraacetic acid, diethylenetriamine pentaacetic acid, salts and mixtures thereof. In preferred embodiments, the weight ratio of urea: sequestering agent is in the range from about 10:1 to about 1:1.

Mild surfactants suitable for inclusion in compositions according to the present invention can be selected from anionic, amphoteric and zwitterionic surfactants and mixtures thereof. The total level of surfactant, inclusive of anionic, oil derived nonionic, zwitterionic, amphoteric and other surfactant components is preferably from about 5.1% to about 70%, more

preferably from about 8% to about 40%, and especially from about 10% to about 35% by weight. The compositions preferably comprise a mixture of anionic with zwitterionic and/or amphoteric surfactants. The level of the individual anionic, zwitterionic and amphoteric surfactant components is in the range from about 1% to about 15%, and especially from about 2% to about 13% by weight of the composition, while the level of oil-derived nonionic surfactant is preferably from about 2% to about 16%, more preferably from about 3% to about 12% by weight. The total level of anionic, amphoteric, and zwitterionic surfactant components, is preferably from about 5% to about 50%, more preferably from about 8% to about 35% and especially from about 9% to about 30% by weight of composition. The weight ratio of anionic surfactant : zwitterionic and/or amphoteric surfactant is in the range from about 1:2 to about 6:1. Other suitable compositions within the scope of the invention comprise mixtures of anionic, zwitterionic and/or amphoteric surfactants with one or more auxiliary nonionic surfactants. The level of the auxiliary nonionic surfactant, when present, is in the range from about 0.1% to about 20% by weight of the composition.

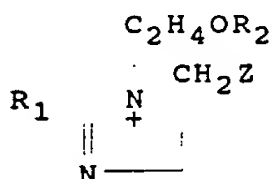
Anionic surfactants suitable for inclusion in the compositions of the invention can generally be described as mild synthetic detergent surfactants and include ethoxylated alkyl sulfates, alkyl glyceryl ether sulfonates, methyl acyl taurates, fatty acyl glycines, N-acyl glutamates, acyl isethionates, alkyl sulfosuccinates, alpha-sulfonated fatty acids, their salts and/or their esters, alkyl ethoxy carboxylates, alkyl phosphate esters, ethoxylated alkyl phosphate esters, acyl sarcosinates and fatty acid/protein condensates, and mixtures thereof. Alkyl and/or acyl chain lengths for these surfactants are C<sub>8</sub>-C<sub>22</sub>, preferably C<sub>10</sub>-C<sub>18</sub> more preferably C<sub>12</sub>-C<sub>14</sub>.

Preferred for use herein from the viewpoint of optimum mildness and lathering characteristics are the salts of sulfuric acid esters of the reaction product of 1 mole of a higher fatty alcohol and from about 1 to about 12 moles of ethylene oxide, with sodium and magnesium being the preferred counterions. Particularly preferred are the alkyl sulfates containing from about 2 to 6, preferably 2 to 4 moles of ethylene oxide, such as sodium laureth-2 sulfate, sodium laureth-3 sulfate and magnesium sodium laureth-3.6 sulfate. In preferred embodiments, the anionic surfactant contains at

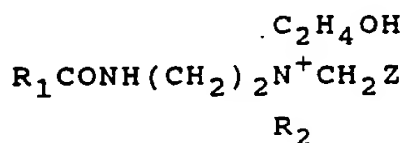
least about 50%, especially at least about 75% by weight of ethoxylated alkyl sulfate.

The compositions for use herein suitably also contain an amphoteric surfactant. Amphoteric surfactants suitable for use in the compositions of the invention include:

- (a) imidazolinium surfactants of formula (I)

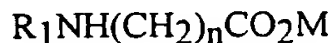


wherein R<sub>1</sub> is C<sub>7</sub>-C<sub>22</sub> alkyl or alkenyl, R<sub>2</sub> is hydrogen or CH<sub>2</sub>Z, each Z is independently CO<sub>2</sub>M or CH<sub>2</sub>CO<sub>2</sub>M, and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula (II)

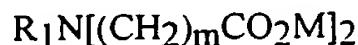


wherein R<sub>1</sub>, R<sub>2</sub> and Z are as defined above;

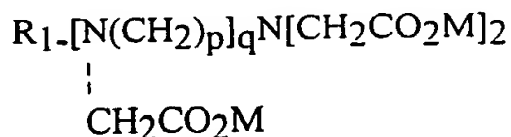
- (b) aminoalkanoates of formula (III),



iminodialkanoates of formula (IV)



and iminopolyalkanoates of formula (V)



wherein n, m, p, and q are numbers from 1 to 4, and R<sub>1</sub> and M are independently selected from the groups specified above; and

(c) mixtures thereof.

Suitable amphoteric surfactants of type (a) are marketed under the trade name Miranol and Empigen and are understood to comprise a complex mixture of species. Traditionally, the Miranols have been described as having the general formula I, although the CTFA Cosmetic Ingredient Dictionary, 4th Edition indicates the non-cyclic structure II. In practice, a complex mixture of cyclic and non-cyclic species is likely to exist and both definitions are given here for sake of completeness. Preferred for use herein, however, are the non-cyclic species.

Examples of suitable amphoteric surfactants of type (a) include compounds of formula I and/or II in which R<sub>1</sub> is C<sub>8</sub>H<sub>17</sub> (especially isocapryl), C<sub>9</sub>H<sub>19</sub> and C<sub>11</sub>H<sub>23</sub> alkyl. Especially preferred are the compounds in which R<sub>1</sub> is C<sub>9</sub>H<sub>19</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is H; the compounds in which R<sub>1</sub> is C<sub>11</sub>H<sub>23</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is CH<sub>2</sub>CO<sub>2</sub>M; and the compounds in which R<sub>1</sub> is C<sub>11</sub>H<sub>23</sub>, Z is CO<sub>2</sub>M and R<sub>2</sub> is H.

In CTFA nomenclature, materials suitable for use in the present invention include cocoamphocarboxypropionate, cocoamphocarboxy propionic acid, and especially cocoamphoacetate and cocoamphodiaceate (otherwise referred to as cocoamphocarboxyglycinate). Specific commercial products include those sold under the trade names of Ampholak 7TX (sodium carboxy methyl tallow polypropyl amine), Empigen CDL60 and CDR 60 (Albright & Wilson), Miranol H2M Conc. Miranol C2M Conc. N.P., Miranol C2M Conc. O.P., Miranol C2M SF, Miranol CM Special (Rhône-Poulenc); Alkateric 2CIB (Alkaril Chemicals); Amphoterge W-2



(Lonza, Inc.); Monateric CDX-38, Monateric CSH-32 (Mona Industries); Rewoteric AM-2C (Rewo Chemical Group); and Schercotic MS-2 (Scher Chemicals).

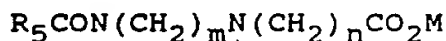
It will be understood that a number of commercially-available amphoteric surfactants of this type are manufactured and sold in the form of electroneutral complexes with, for example, hydroxide counterions or with anionic sulfate or sulfonate surfactants, especially those of the sulfated C<sub>8</sub>-C<sub>18</sub> alcohol, C<sub>8</sub>-C<sub>18</sub> ethoxylated alcohol or C<sub>8</sub>-C<sub>18</sub> acyl glyceride types. Preferred from the viewpoint of mildness and product stability, however, are compositions which are essentially free of (non-ethoxylated) sulfated alcohol surfactants. Note also that the concentrations and weight ratios of the amphoteric surfactants are based herein on the uncomplexed forms of the surfactants, any anionic surfactant counterions being considered as part of the overall anionic surfactant component content.

Examples of preferred amphoteric surfactants of type (b) include N-alkyl polytrimethylene poly-carboxymethylamines sold under the trade names Ampholak X07 and Ampholak 7CX by Berol Nobel and also salts, especially the triethanolammonium salts and salts of N-lauryl-beta-amino propionic acid and N-lauryl-imino-dipropionic acid. Such materials are sold under the trade name Deriphath by Henkel and Mirataine by Rhône-Poulenc.

The compositions herein can also contain from about 0.1% to about 20%, more preferably from about 0.1% to about 10%, and especially from about 1% to about 8% by weight of a zwitterionic surfactant, especially an alkyl betaine or amido betaine surfactant.

Betaine surfactants suitable for inclusion in the composition of the invention include alkyl betaines of the formula

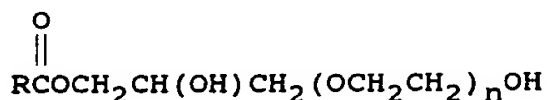
$R_5R_6R_7N^+(CH_2)_nCO_2M$  (VIII) and amido betaines of the formula (IX)



R<sub>7</sub>

wherein R<sub>5</sub> is C<sub>12</sub>-C<sub>22</sub> alkyl or alkenyl, R<sub>6</sub> and R<sub>7</sub> are independently C<sub>1</sub>-C<sub>3</sub> alkyl, M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium, and n, m are each numbers from 1 to 4. Preferred betaines include cocoamidopropyldimethylcarboxymethyl betaine, laurylamidopropyldimethylcarboxymethyl betaine and Tego betaine.

The compositions of the invention also contain from about 0.1% to about 20%, preferably from about 1% to about 15%, and more preferably from about 2% to about 10% by weight of an oil derived nonionic surfactant or mixture of oil derived nonionic surfactants. Oil derived nonionic surfactants are valuable in compositions according to the invention for the provision of skin feel benefits both in use and after use. Suitable oil derived nonionic surfactants for use herein include water soluble vegetable and animal-derived emollients such as triglycerides with a polyethyleneglycol chain inserted; ethoxylated mono and di-glycerides, polyethoxylated lanolins and polyethoxylated butter derivatives. One preferred class of oil-derived nonionic surfactants for use herein have the general formula (VI)



wherein n is from about 3 to about 200, preferably from about 20 to about 100, more preferably from about 30 to about 85, and wherein R comprises an aliphatic radical having on average from about 5 to 20 carbon atoms, preferably from about 9 to 18 carbon atoms.

Suitable ethoxylated oils and fats of this class include polyethyleneglycol derivatives of glyceryl cocoate, glyceryl caprate, glyceryl caprylate, glyceryl tallowate, glyceryl palmitate, glyceryl stearate, glyceryl laurate, glyceryl oleate, glyceryl ricinoleate, and glyceryl fatty esters derived from triglycerides, such as palm oil, almond oil, and corn oil, preferably glyceryl tallowate and glyceryl cocoate.

Suitable oil derived nonionic surfactants of this class are available from Croda Inc. (New York, USA) under their Crovol line of materials such as Crovol EP40 (PEG 20 evening primrose glyceride), Crovol EP 70 (PEG

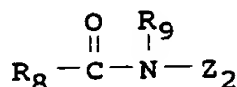
60 evening primrose glyceride) Crovol A-40 (PEG 20 almond glyceride), Crovol A-70 (PEG 60 almond glyceride), Crovol M-40 (PEG 20 maize glyceride), Crovol M-70 (PEG 60 maize glyceride), Crovol PK-40 (PEG 12 palm kernel glyceride), and Crovol PK-70 (PEG 45 palm kernel glyceride) and under their Solan range of materials such as Solan E, E50 and X polyethoxylated lanolins and Aqualose L-20 (PEG 24 lanolin alcohol) available from Westbrook Lanolin. Further suitable surfactants of this class are commercially available from Sherex Chemical Co. (Dublin, Ohio, USA) under their Varonic LI line of surfactants. These include, for example, Varonic LI 48 (polyethylene glycol (n=80) glyceryl tallowate, alternatively referred to as PEG 80 glyceryl tallowate), Varonic LI 2 (PEG 28 glyceryl tallowate), Varonic LI 420 (PEG 200 glyceryl tallowate), and Varonic LI 63 and 67 (PEG 30 and PEG 80 glyceryl cocoates). Other oil-derived emollients suitable for use are PEG derivatives of corn, avocado, and babassu oil, as well as Softigen 767 (PEG(6) caprylic/capric glycerides).

Also suitable for use herein are nonionic surfactants derived from composite vegetable fats extracted from the fruit of the Shea Tree (*Butyrospermum Karkii* Kotschy) and derivatives thereof. This vegetable fat, known as Shea Butter is widely used in Central Africa for a variety of means such as soap making and as a barrier cream, it is marketed by Sederma (78610 Le Perray En Yvelines, France). Particularly suitable are ethoxylated derivatives of Shea butter available from Karlshamn Chemical Co. (Columbus, Ohio, USA) under their Lipex range of chemicals, such as Lipex 102 E-75 (ethoxylated mono, di-glycerides of Shea butter). Similarly, ethoxylated derivatives of Mango, Cocoa and Illipe butter may be used in compositions according to the invention. Although these are classified as ethoxylated nonionic surfactants it is understood that a certain proportion may remain as non-ethoxylated vegetable oil or fat.

Other suitable oil-derived nonionic surfactants include ethoxylated derivatives of almond oil, peanut oil, rice bran oil, wheat germ oil, linseed oil, jojoba oil, oil of apricot pits, walnuts, palm nuts, pistachio nuts, sesame seeds, rapeseed, cade oil, corn oil, peach pit oil, poppyseed oil, pine oil, castor oil, soybean oil, avocado oil, safflower oil, coconut oil, hazelnut oil, olive oil, grapeseed oil, and sunflower seed oil.

Oil derived nonionic surfactants highly preferred for use herein from the viewpoint of optimum mildness and skin feel characteristics are PEG 60 evening primrose triglycerides; PEG 55 lanolin polyethoxylated derivatives and ethoxylated derivatives of Shea butter. In preferred embodiments the weight ratio of urea: oil derived nonionic surfactant is in the range from about 5:1 to about 1:9.

In addition to the above oil derived nonionic surfactants, the compositions of the invention can also comprise an auxiliary nonionic surfactant at levels from about 0.1% to about 20%, more preferably from about 0.1% to about 10%, and especially from about 1% to about 8% by weight. Surfactants of this class include C12-C14 fatty acid mono- and diethanolamides, sucrose polyester surfactants and polyhydroxy fatty acid amide surfactants having the general formula (VII).



The preferred polyhydroxy fatty acid amide surfactants are those in which R<sub>9</sub> is C<sub>1-4</sub> alkyl, preferably methyl, and R<sub>8</sub> is C<sub>7-19</sub> alkyl or alkenyl, more preferably straight-chain C<sub>9-17</sub> alkyl or alkenyl, or mixture thereof; and Z<sub>2</sub> is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxyated derivative (preferably ethoxylated or propoxylated) thereof. Z<sub>2</sub> preferably will be derived from a reducing sugar in a reductive amination reaction; more preferably Z<sub>2</sub> is a glycityl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. As raw materials, high dextrose corn syrup, high fructose corn syrup, and high maltose corn syrup can be utilized as well as the individual sugars listed above. These corn syrups may yield a mix of sugar components for Z<sub>2</sub>. It should be understood that it is by no means intended to exclude other suitable raw materials. Z<sub>2</sub> preferably will be selected from the group consisting of -CH<sub>2</sub>(CHOH)<sub>n</sub>-CH<sub>2</sub>OH, -CH(CH<sub>2</sub>OH)-(CHOH)<sub>n-1</sub>-CH<sub>2</sub>OH, -CH<sub>2</sub>-(CHOH)<sub>2</sub>(CHOR')(CHOH)-CH<sub>2</sub>OH, where n is an integer from 3 to 5, inclusive, and R' is H or a cyclic or aliphatic monosaccharide, and alkoxyated derivatives thereof. Most preferred are glycityls wherein n is 4, particularly -CH<sub>2</sub>-(CHOH)<sub>4</sub>-CH<sub>2</sub>OH.

The most preferred polyhydroxy fatty acid amide has the formula  $R_8(CO)N(CH_3)CH_2(CHOH)_4CH_2OH$  wherein  $R_8$  is a C11-C17 straight chain alkyl or alkenyl group.

The compositions of the invention may also contain from about 0.1% to about 8%, preferably from about 0.5% to about 6%, and especially from about 1.5% to about 5% by weight of saturated and unsaturated acyl fatty acids having a weight average chain length of from 10 to 22, preferably from 12 to 18 carbon atoms. Highly preferred is palm kernel.

The compositions of the invention may also include an insoluble perfume or cosmetic oil or wax or a mixture thereof at a level up to about 10%, preferably up to about 3% by weight wherein the oil or wax is insoluble in the sense of being insoluble in the product matrix at a temperature of 25°C. Addition of such oils or waxes can provide emolliency, mildness and rinsibility characteristics to personal cleansing compositions according to the invention. It is a feature of the invention, however, that compositions having excellent emolliency and mildness together with desirable physical attributes (clarity etc.) can be delivered which are essentially oil-free, ie which contain less than about 1%, preferably less than 0.5% by weight of an added oil phase. Physically, preferred compositions of this type take the form of an optically-clear solution or microemulsion. In compositions including an additional perfume or cosmetic oil or wax, preferably the weight ratio of oil-derived nonionic surfactant to added oil is at least about 1:2, more especially at least about 3:1.

Suitable insoluble cosmetic oils and waxes for use herein can be selected from water-insoluble silicones inclusive of non-volatile polyalkyl and polyaryl siloxane gums and fluids, volatile cyclic and linear polyalkylsiloxanes, polyalkoxylated silicones, amino and quaternary ammonium modified silicones, rigid cross-linked and reinforced silicones and mixtures thereof, C<sub>1</sub>-C<sub>24</sub> esters of C<sub>8</sub>-C<sub>30</sub> fatty acids such as isopropyl myristate and cetyl ricinoleate, C<sub>8</sub>-C<sub>30</sub> esters of benzoic acid, beeswax, saturated and unsaturated fatty alcohols such as behenyl alcohol, hydrocarbons such as mineral oils, petrolatum, squalane and squalene,

polybutene, fatty sorbitan esters (see US-A-3988255, Seiden, issued October 26th 1976), lanolin and oil-like lanolin derivatives, animal and vegetable triglycerides such as almond oil, peanut oil, wheat germ oil, rice bran oil, linseed oil, jojoba oil, oil of apricot pits, walnuts, palm nuts, pistachio nuts, sesame seeds, rapeseed, cade oil, corn oil, peach pit oil, poppyseed oil, pine oil, castor oil, soybean oil, avocado oil, safflower oil, coconut oil, hazelnut oil, olive oil, grapeseed oil, and sunflower seed oil, and C<sub>1</sub>-C<sub>24</sub> esters of dimer and trimer acids such as diisopropyl dimerate, diisostearylmalate, diisostearyldimerate and triisostearyltrimerate.

The compositions of the invention may also contain a cationic or nonionic polymeric skin or hair conditioning agent at a level from about 0.01% to about 5%, preferably from about 0.05% to about 3% and especially from about 0.1% to about 2% by weight. The polymer is found to be valuable for enhancing the creaminess and quality of the foam as well as providing a hair or skin conditioning utility.

Suitable polymers are high molecular weight materials (mass-average molecular weight determined, for instance, by light scattering, being generally from about 2,000 to about 3,000,000, preferably from about 5,000 to about 1,000,000 more preferably from 100,000 to about 1,000,000).

Suitable polymers are the cationic, nonionic, amphoteric, and anionic polymers useful in the cosmetic field. Preferred are cationic and nonionic polymers used in the cosmetic fields as hair or skin conditioning agents.

Representative classes of polymers include cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid; cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylamide and/or acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.

By way of exemplification, cationic polymers suitable for use herein include cationic guar gums such as hydroxypropyl trimethyl ammonium guar gum (d.s. of from 0.11 to 0.22) available commercially under the trade

names Jaguar C-14-S(RTM) and Jaguar C-17(RTM) and also Jaguar C-16(RTM), which contains hydroxypropyl substituents (d.s. of from 0.8-1.1) in addition to the above-specified cationic groups, and quaternized cellulose ethers available commercially under the trade names Ucare Polymer JR-30M, JR-400 and Celquat. Other suitable cationic polymers are homopolymers of dimethyldiallylammonium chloride available commercially under the trade name Merquat 100, copolymers of dimethyl aminoethylmethacrylate and acrylamide, copolymers of dimethyldiallylammonium chloride and acrylamide, available commercially under the trade names Merquat 550 and Merquat S, acrylic acid/dimethyldiallylammonium chloride/acrylamide copolymers available under the trade name Merquat 3300, quaternized vinyl pyrrolidone acrylate or methacrylate copolymers of amino alcohol available commercially under the trade name Gafquat, for example Polyquaternium 11, 23 and 28 (quaternized copolymers of vinyl pyrrolidone and dimethyl aminoethylmethacrylate - Gafquat 755N and HS-100), vinyl pyrrolidone/vinyl imidazolium methochloride copolymers available under the trade names Luviquat HM552, Polyquaternium 2, and polyalkyleneimines such as polyethylenimine and ethoxylated polyethylenimine.

The viscosity of the final composition (Brookfield RVT/DCP, 1 rpm with cone CP41 or CP52, 25°C, neat) is preferably at least about 500 cps, more preferably from about 1,000 to about 50,000 cps, especially from about 2,000 to about 30,000 cps, the viscosity being controlled using conventional hydrophilic gelling agents and thickeners.

The compositions of the invention thus can also contain a hydrophilic gelling agent at a level preferably from about 0.01% to about 10%, more preferably from about 0.02% to about 2%, and especially from about 0.02% to about 0.5%. The gelling agent preferably has a viscosity (1% aqueous solution, 20°C, Brookfield RVT) of at least about 4000 mPa.s, more preferably a least about 10,000 mPa.s and especially at least 50,000 mPa.s.

Suitably hydrophilic gelling agents can generally be described as water-soluble or colloiddally water-soluble polymers, and include cellulose ethers (e.g. hydroxyethyl cellulose, methyl cellulose, hydroxypropylmethyl

cellulose), polyvinylpyrrolidone, polyvinylalcohol, guar gum, hydroxypropyl guar gum and xanthan gum.

Preferred hydrophilic gelling agents herein, however, are acrylic acid/ethyl acrylate copolymers and the carboxyvinyl polymers sold by the B.F. Goodrich Company under the trade mark of Carbopol resins. These resins consist essentially of a colloiddally water-soluble polyalkenyl polyether crosslinked polymer of acrylic acid crosslinked with from 0.75% to 2.00% of a crosslinked agent such as for example polyallyl sucrose or polyallyl pentaerythritol. Examples include Carbopol 934, Carbopol 940, Carbopol 950, Carbopol 980, Carbopol 951 and Carbopol 981. Carbopol 934 is a water-soluble polymer of acrylic acid crosslinked with about 1% of a polyallyl ether of sucrose having an average of about 5.8 allyl groups for each sucrose molecule. A most preferred polymer is Carbopol 951. Also suitable for use herein are hydrophobically-modified cross-linked polymers of acrylic acid having amphipathic properties available under the Trade Name Carbopol 1382, Carbopol ETD 2020, Carbopol 1342 and Pemulen TR-1 (CFTA Designation: Acrylates/10-30 Alkyl Acrylate Crosspolymer). A combination of the polyalkenyl polyether cross-linked acrylic acid polymer and hydrophobically modified cross-linked acrylic acid polymer is also suitable for use herein. The gelling agents herein are particularly valuable for providing excellent stability characteristics over both normal and elevated temperatures.

Neutralizing agents suitable for use in neutralizing acidic group containing hydrophilic gelling agents herein include sodium hydroxide, potassium hydroxide, ammonium hydroxide, monoethanolamine, diethanolamine and triethanolamine.

The cleansing compositions can optionally include other hair or skin moisturizers which are soluble in the cleansing composition matrix. The preferred level of such moisturizers is from about 0.5% to about 20% by weight. In preferred embodiments, the moisturizer is selected from:

1. water-soluble liquid polyols;
2. essential amino acid compounds found naturally occurring in the stratum corneum of the skin; and



3. water-soluble nonpolyol nonocclusives and mixtures thereof.

Some examples of more preferred nonocclusive moisturizers are polybutene, squalane, glycerine, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and propylene glycol ethers of methyl glucose (e.g. ethyl glucam E-20 and propylglucan P-10), polyethylene glycol and propylene glycol ethers of lanolin alcohol (e.g. Solulan-75), sodium pyrrolidone carboxylic acid, L-proline, guanidine, pyrrolidone, hydrolyzed protein and other collagen-derived proteins, aloe vera gel and acetamide MEA and mixtures thereof. Of the above, glycerine is highly preferred.

A number of additional optional materials can be added to the cleansing compositions each at a level of from about 0.1% to about 2% by weight. Such materials include proteins and polypeptides and derivatives thereof; water-soluble or solubilizable preservatives such as DMDM Hydantoin, Germall 115, methyl, ethyl, propyl and butyl esters of hydroxybenzoic acid, EDTA, Euxyl (RTM) K400, natural preservatives such as benzyl alcohol, potassium sorbate and bisabolol; sodium benzoate and 2-phenoxyethanol; other moisturizing agents such as hyaluronic acid, chitin, and starch-grafted sodium polyacrylates such as Sanwet (RTM) IM-1000, IM-1500 and IM-2500 available from Celanese Superabsorbent Materials, Portsmouth, VA, USA and described in US-A-4,076,663; solvents such as hexylene glycol and propylene glycol; anti-bacterial agents such as Oxeco (phenoxy isopropanol); low temperature phase modifiers such as ammonium ion sources (e.g.  $\text{NH}_4\text{Cl}$ ); viscosity control agents such as magnesium sulfate and other electrolytes; colouring agents; pearlescers and opacifiers such as ethylene glycol distearate,  $\text{TiO}_2$  and  $\text{TiO}_2$ -coated mica; perfumes and perfume solubilizers; and zeolites such as Valfour BV400 and derivatives thereof. Water is also present at a level preferably of from about 30% to about 94% preferably at least about 60% by weight of the compositions herein.

The pH of the compositions is preferably from about 4 to about 10, preferably from about 6 to about 9.

The invention is illustrated by the following non-limiting examples.

In the examples, all concentrations are on a 100% active basis and the abbreviations have the following designation:

Amphoteric	Cocoamphodiacetate
Anionic 1	Sodium laureth-2 sulfate
Anionic 2	Magnesium sodium laureth 3.6 sulfate
Solan	Solan (RTM) E (PEG 55 lanolin)
Shea	Hydrosoluble Shea Butter (PEG 75)
Crovol	Crovol (RTM) EP 70 (PEG 60 evening primrose triglycerides)
GA	Polyhydroxy fatty acid amide of formula VII in which R <sub>8</sub> is C <sub>11</sub> -C <sub>17</sub> alkyl, R <sub>9</sub> is methyl, and Z <sub>2</sub> is CH <sub>2</sub> (CHOH) <sub>4</sub> CH <sub>2</sub> OH
DEA	Coconut diethanolamide
Betaine	Cocoamidopropyl betaine
Polymer	Polymer JR-400 - hydroxyethylcellulose reacted with epichlorohydrin and quaternized with trimethylamine, m.wt. 4 x 10 <sup>6</sup>
Preservative	DMDM Hydantoin
Pearlescer	Ethyleneglycoldistearate/emulsifier mixture
Oil	Soybean oil

Softigen 767	PEG(6) caprylic/capryl glycerate
EDTA	Ethylenediaminetetraacetic acid
EDDS	Ethylenediaminedisuccinic acid (EDDS)

Examples I to VII

The following are personal cleansing compositions in the form of shower gel or bath foam products and which are representative of the present invention:

	I	II	III	IV	V	VI
Amphoteric	3.0	3.0	-	5.0	-	4.0
Anionic 1	6.0	6.0	8.0	10.0	6.0	4.0
Anionic 2	-	2.0	2.0	2.0	1.0	-
GA	3.0	-	-	3.0	3.0	2.0
Betaine	-	-	4.0	-	3.0	-
Oil	-	4.0	4.0	6.0	4.0	-
Softigen 767	-	3.0	-	2.0	2.0	-
Solan	2.0	3.0	2.0	1.0	-	2.0
Crovol	2.0	-	1.0	-	-	3.0
Polymer	1.0	1.0	1.0	1.0	1.0	1.0
Pearlescer	1.0	1.0	3.0	3.0	1.0	1.0
Preservative	0.5	0.5	0.5	0.5	0.5	0.8
Perfume	1.0	1.0	1.0	1.0	1.0	1.0
Glycerine	3.0	3.0	-	3.0	-	-
Urea	5.0	4.0	1.0	8.0	5.0	3.0
DEA	-	0.5	1.0	-	0.5	0.1

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EDTA	1.0	0.5	1.0	-	1.5	-
EDDS	-	-	-	0.5	-	1
Water	----- to 100 -----					

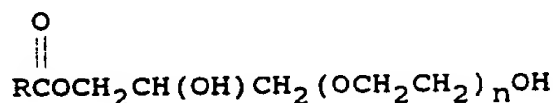
Compositions I to VI are prepared by forming a surfactant phase A at room temperature containing a portion of the water, the anionic, amphoteric and oil-derived nonionic surfactants and the remaining water-soluble, oil-insoluble ingredients including the chelating agents. In compositions which comprise water-insoluble ingredients an oil phase B is formed from these oil-soluble ingredients which is then admixed with A at about 40-70°C and cooled to ambient temperature. Finally the remaining water, preservative, urea and perfume are added.

The compositions have a viscosity (Brookfield RVT/DCP, 1 rpm with Cone CP41 or CP52, 25°C, neat) in the range from 1,000 to 10,000 cps.

The products provide excellent in-use and efficacy benefits including mildness, skin feel during and after use, skin moisturising and dryness, stability, cleansing, lathering and rinsibility.

**CLAIMS**

1. A personal cleansing composition comprising:
  - (a) from about 5% to about 50% by weight of one or more surfactants selected from anionic, zwitterionic and amphoteric surfactants and mixtures thereof;
  - (b) from about 0.1% to about 20 % by weight of a water-soluble or dispersible nonionic surfactant selected from ethoxylated animal and vegetable oils and fats and mixtures thereof;
  - (c) from about 0.5% to about 10% by weight urea;
  - (d) from about 0.1% to about 5% by weight of  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestering agent;
  - (e) optionally up to about 10% by weight of perfume or cosmetic oil; and,
  - (f) water.
2. A composition according to Claim 1 wherein the composition has a viscosity (Brookfield RVT/DCP, 1 rpm with Cone CP41 or CP52, 25°C, neat) in the range from 1,000 to 50,000 cps .
3. A composition according to Claim 1 or 2 wherein the oil derived nonionic surfactant comprises one or more ethoxylated oils or fats having the formula (VI)



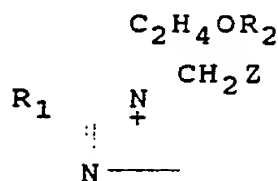
wherein n is from about 3 to about 200, preferably from about 20 to about 100, more preferably from about 30 to about 85, and wherein R comprises an aliphatic radical having an average from about 5 to 20

carbon atoms, preferably from about 9 to 20 carbon atoms, more preferably from about 11 to 18 carbon atoms, most preferably from about 12 to 16 carbon atoms.

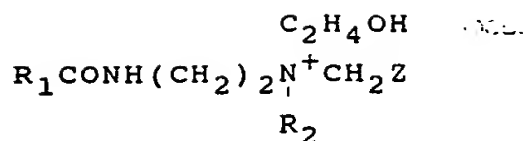
4. A composition according to Claims 1 to 3 comprising from about 2% to about 16%, preferably from about 3% to about 12%, by weight of the oil derived nonionic surfactant.
5. A composition according to Claims 1 to 4 wherein the urea is at a level of from about 0.5% to about 8%, preferably from about 2% to about 6% by weight.
6. A composition according to any of Claims 1 to 5 wherein the  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestering agent has a  $\text{Ca}^{2+}$  chelating stability constant ( $\text{pK Ca}^{2+}$ ) of at least about 5, preferably at least about 6, more preferably at least 7 at 25°C and is present at a level of from about 0.5% to about 2% by weight.
7. A composition according to any of Claims 1 to 6 wherein the  $\text{Ca}^{2+}/\text{Mg}^{2+}$  sequestering agent is selected from polycarboxylates, amino polycarboxylates, polyphosphates, polyphosphonates and aminopolyphosphonates and water-soluble salts and mixtures thereof, preferably ethylenediaminetetraacetic acid, ethylenediaminedisuccinic acid, diethylenetriamine pentaacetic acid, pyrophosphoric acid, and their water soluble salts, and mixtures thereof.
8. A composition according to Claims 1 to 7 wherein the weight ratio of urea: oil derived nonionic surfactant is in the range from about 5:1 to about 1:9 and the weight ratio of urea: sequestering agent is in the range from about 10:1 to about 1:1.
9. A composition according to Claims 1 to 8 wherein the oil derived nonionic surfactant, urea and sequestering agent together comprise from about 1.5% to about 20%, preferably from about 2% to about 15% most preferably from about 2.5% to about 10% by weight of the composition.



10. A composition according to Claims 1 to 9 comprising a mixture of anionic with zwitterionic and/or amphoteric surfactants.
11. A composition according to any of Claims 1 to 10 where the level of the individual anionic, zwitterionic and amphoteric surfactant components is in the range from about 1% to about 15%, preferably from about 2% to about 13% by weight.
12. A composition according to Claims 1 to 11 wherein the anionic surfactant is selected from ethoxylated alkyl sulfates, alkyl glyceryl ether sulfonates, methyl acyl taurates, fatty acyl glycines, alkyl ethoxy carboxylates, N-acyl glutamates, acyl isethionates, alkyl sulfosuccinates, alpha-sulfonated fatty acids, their salts and/or their esters, alkyl phosphate esters, ethoxylated alkyl phosphate esters, acyl sarcosinates and fatty acid/protein condensates, and mixtures thereof.
13. A composition according to any Claims 1 to 12 wherein the anionic surfactant comprises an ethoxylated C<sub>8</sub>-C<sub>22</sub> alkyl sulfate.
14. A composition according to any Claims 1 to 13 wherein the amphoteric surfactant is selected from:
  - (a) imidazolinium derivatives of formula (I)

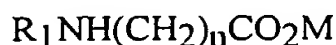


wherein R<sub>1</sub> is C<sub>7</sub>-C<sub>22</sub> alkyl or alkenyl, R<sub>2</sub> is hydrogen or CH<sub>2</sub>Z, each Z is independently CO<sub>2</sub>M or CH<sub>2</sub>CO<sub>2</sub>M, and M is H, alkali metal, alkaline earth metal, ammonium or alkanolammonium; and/or ammonium derivatives of formula (II)

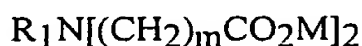


wherein  $R_1$ ,  $R_2$  and  $Z$  are as defined above:

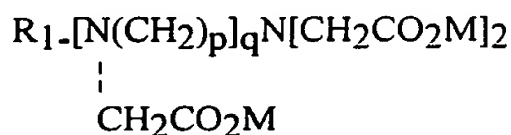
- (b) aminoalkanoates of formula (III),



iminodialkanoates of formula (IV)



and iminopolyalkanoates of formula (V)



wherein  $n$ ,  $m$ ,  $p$ , and  $q$  are numbers from 1 to 4, and  $R_1$  and  $M$  are independently selected from the groups specified in (a) above; and

- (c) mixtures thereof.
15. A composition according to Claim 14 wherein the amphoteric is selected from the imidazolinium derivatives of formula I and/or ammonium derivatives of formula II.
  16. A composition according to any of Claims 1 to 15 wherein the zwitterionic surfactant is selected from alkyl and amido betaines.
  17. A composition according to any of Claims 1 to 16 wherein the weight ratio of anionic surfactant:zwitterionic and/or amphoteric surfactant is in the range from about 1:2 to about 6:1.

18. A composition according to any of Claims 1 to 17 wherein the anionic surfactant, zwitterionic and/or amphoteric surfactant together comprise from about 8% to about 35%, preferably from about 10% to about 30% by weight of the composition.
19. A composition according to any of Claims 1 to 18 which additionally comprises from about 0.1% to about 20% by weight of an auxiliary nonionic surfactant selected from C12-C14 fatty acid mono- and diethanolamides and polyhydroxy fatty acid amide surfactants.
20. A composition according to any of Claims 1 to 19 which is in the form of an optically clear solution or microemulsion.
21. A composition according to any of Claims 1 to 20 wherein the weight ratio of oil-derived nonionic surfactant: cosmetic oil (if present) is at least about 1:2.
22. A composition according to any of Claims 1 to 21 additionally comprising from 0.01% to 5%, preferably from about 0.04% to about 2% and more preferably from 0.05% to 1.5% of a cationic or nonionic polymeric skin or hair conditioning agent, selected from cationic and nonionic polysaccharides; cationic and nonionic homopolymers and copolymers derived from acrylic and/or methacrylic acid, cationic and nonionic cellulose resins; cationic copolymers of dimethyldiallylammonium chloride and acrylic acid; cationic homopolymers of dimethyldiallylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; quaternized silicones, and mixtures thereof.
23. A composition according to any of Claims 1 to 22 additionally comprising moisturiser selected from glycerin, polyethylene glycol, propylene glycol, sorbitol, polyethylene glycol and polypropylene glycol ethers of methyl glucose, sodium pyrrolidone carboxylic acid, L-proline and mixtures thereof.

**Relevant Technical Fields**

- (i) UK Cl (Ed.N) A5B (BFC), C5D (DHF, DHG, DHZ)  
(ii) Int Cl (Ed.6) A61K, C11D

Search Examiner  
M J CONLON

Date of completion of Search  
12 JULY 1995

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE: WPI

Documents considered relevant following a search in respect of Claims :-  
1-23

**Categories of documents**

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2172298 A (PROCTER & GAMBLE)	1
A	EP 0485212 A2 (UNILEVER)	1

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